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(54) Title: METHOD TO IMPROVE TASTE OF BEVERAGES BY ADDITION OF YEAST EXTRACT AND BEVERAGES THEREOF

(57) Abstract: The present invention describes a method for improving the taste and/or aroma of a beverage for human consumption by addition of a yeast extract, characterised in that, said yeast extract comprises free amino acids and one or more 5'-ribonucleotide(s), wherein the total amount of said one or more 5'-ribonucleotide(s) is at least 10% w/w, wherein said one or more 5'-ribonucleotide(s) comprises 5'-GMP and optionally 5'-IMP and wherein the ratio between the percentage (w/w) of free amino acids and the percentage (w/w) of the total amount of 5'-GMP and 5'-IMP in the yeast extract is lower than 3.5, all weights in the yeast extract being based on NaCl free yeast extract dry matter. Preferably said yeast extract comprises an amount in free amino acids lower than 40% NaCl free yeast extract dry matter and/or has a degree of protein hydrolysis lower than 50%. By this method the intrinsic vegetable and/or fruity and/or alcoholic note in the taste and/or aroma of a beverage like fruit or vegetable juice, carbonated drink, e.g. beer can be improved.

METHOD TO IMPROVE TASTE OF BEVERAGES BY ADDITION OF YEAST EXTRACT AND BEVERAGES THEREOF

This invention relates to a method for improving the taste and/or aroma of a beverage for human consumption by addition of a yeast extract. Further the invention relates to beverages for human consumption.

Autolytic yeast extracts are concentrates of the soluble materials obtained from yeast after lysis of the polymeric yeast material. The active yeast enzymes are responsible for the lysis. At this purpose, strains of the genera *Saccharomyces*, *Kluyveromyces* and *Candida* can for example be used. This type of yeast extracts, which is rich in amino acids, is used in the food industry as basic taste providers. The amino acids present in the yeast extract add a bouillon-type brothy taste to the food without adding any specific notes.

Hydrolytic yeast extracts are concentrates of the soluble materials obtained from yeast after lysis, when to the yeast suspension during lysis additional proteases, and/or peptidases and especially nucleases are added. During this process 5'-ribonucleotides of guanine (5'-GMP), uracil (5'-UMP), cytosine (5'-CMP) and adenine (5'-AMP) are formed. When adenylic deaminase is added to the mixture, 5'-AMP is transformed into 5'-inosine mono phosphate (5'-IMP). The hydrolytic yeast extracts obtained by this method are therefore rich in 5'-ribonucleotides, especially rich in 5'-GMP and 5'-IMP. Often yeast extracts are also rich in mono sodium glutamate (MSG). 5'-IMP, 5'-GMP and MSG are known for their flavour enhancing properties. They are capable of enhancing the savoury and delicious taste in certain types of food. This phenomenon is described as 'mouthfeel' or umami. The natural 5'-ribonucleotides of these yeast extracts demonstrate a synergistic effect with the glutamate present in the extract as well as in the food substrates to provide the enhanced savoury attributes to processed food. These 5'-ribonucleotides and, optionally, MSG, or yeast extracts comprising the same find their application in soups, sauces, marinades, flavour seasonings, meat, vegetables, and gravies..

It is known that autolytic yeast extracts, which are rich in amino acids, can be used in drinks, especially sport drinks, to enhance the nutritional value thereof.

European Patent Application No. 418616 describes a beverage comprising an artificial sweetener which sweetness can be improved by addition of a yeast extract. Said

yeast extract may comprise 5'-ribonucleotides, especially 5'-IMP and/or 5'-GMP. This yeast extract has actually the disadvantage of partially conferring a light brothy/bouillon taste to the beverage where it is used, i.e. this yeast extract is not clean in taste.

The present invention provides a method for improving the taste and/or aroma of a beverage for human consumption by addition of a yeast extract without conferring to the beverage any taste or specific note of the yeast extract itself or where this taste/note are minimal. Yeast extract is a composition which comprises the soluble components extracted from yeast cells or the modified components thereof. This composition comprises at least 5'-ribonucleotides. In general, this composition also comprises amino acids, proteins, peptides, vitamins, carbohydrates and salts like phosphates.

The present invention gives a method for improving the taste and/or aroma of a beverage for human consumption by addition of a yeast extract, characterised in that, said yeast extract comprises free amino acids and one or more 5'-ribonucleotide(s), wherein the total amount of said one or more 5'-ribonucleotide(s) is at least 10% w/w, wherein said one or more 5'-ribonucleotide(s) comprises 5'-GMP and optionally 5'-IMP and wherein the ratio between the percentage (w/w) of free amino acids and the percentage (w/w) of the total amount of 5'-GMP and 5'-IMP in the yeast extract is lower than 3.5, all weights in the yeast extract being based on NaCl free yeast extract dry matter.

The yeast extracts used in the invention are generally obtained from yeast strains with a high RNA content. By this way a high amount of 5'-ribonucleotides is generated during the hydrolytic process. Generally yeast strains are used belonging to the genera *Saccharomyces*, *Kluyveromyces* and *Candida*. Yeast strains belonging to the genus *Saccharomyces*, for example to the strain *Saccharomyces cerevisiae* are preferred above yeast extracts derived from strains belonging to the genus *Candida*, for example to *Candida utilis*, or Torula yeast, as yeast extracts derived from the latter are characterized by a sweet taste as described for example in the Japanese Patent Application No. 10327802. The addition of a sweet taste due to the yeast extract to some beverages for human consumption, for example beer, is not very desirable.

With the term "5'-ribonucleotide" it is herewith intended either the free 5'-ribonucleotide or a salt thereof. However all weight percentages of 5'-ribonucleotide

contents in the yeast extract are calculated based on the disodium salt heptahydrate thereof and are based on NaCl free yeast extract dry matter. NaCl free yeast extract dry matter means that the calculations are based on yeast extract dry matter only and therefore the sodium chloride contained in the yeast extract is excluded from this calculation.

Surprisingly we have found that when the yeast extract used in the method of the invention comprises free amino acids, at least 10% w/w of ribonucleotides, said ribonucleotides comprise 5'-GMP and optionally 5'-IMP and the ratio between the percentage (w/w) of free amino acids and the percentage (w/w) of the total amount of 5'-GMP and 5'-IMP in the yeast extract is lower than 3.5, this is very beneficial to the taste and/or aroma of the beverage wherein said yeast extract is added. By this combination the taste and/or aroma of the beverage is improved whle any taste/note properties of the yeast extract, generally a bouillon or brothy taste, is absent in the beverage.

With "percentage (w/w) of the total amount of 5'-GMP and 5'-IMP" it is intended the total amount of 5'-GMP plus 5'-IMP measured as weight percentage in respect of NaCl free yeast extract dry matter.

With "percentage (w/w) of free amino acids" used in the ratio above it is intended the weight percentage of free amino acids in the yeast extract based on NaCl free yeast extract dry matter.

Preferably the yeast extract used in the invention comprises both 5'-GMP and 5'-IMP.

Preferably, the yeast extract used in the invention has a low content in free amino acids and/or a low degree of protein hydrolysis. The latter is beneficial to the taste and/or aroma of the beverage wherein said yeast extract is added. The degree of protein hydrolysis in the yeast extract is measured as the percentage of nitrogen belonging to primary amino groups of proteins, peptides or free amino acids in respect of the total nitrogen of protein origin in the yeast extract.

The yeast extract used in the method of the invention preferably comprises an amount in free amino acids lower than 40% w/w, more preferably lower than 35% w/w, even more preferably lower than 25% w/w, and most preferably lower than 20% w/w based NaCl free yeast extract dry matter. The yeast extract used in this method preferably comprises an amount of free amino acids of at least 1% w/w, more preferably of at least 5% w/w based on NaCl free yeast extract dry matter.

The yeast extract used in the method of the invention preferably has a degree of protein hydrolysis lower than 50%, preferably comprised between 5 and 45%, more preferably between 10 and 45%, even more preferably between 20 and 45%, most preferably 30 and 45%.

The yeast extract used in the compositions of the invention preferably comprises a total amount of the one or more 5'-ribonucleotide(s) between 10 and 50% w/w based on NaCl free yeast extract dry matter, preferably between 10 and 40% w/w, more preferably between 10 and 30% w/w, even more preferably between 10 and 25% w/w.

The presence of 5'-GMP and optionally 5'-IMP in the yeast extract has a beneficial effect in improving the taste and/or aroma of the beverage wherein it is added.

Therefore in a preferred embodiment of the invention, the percentage (w/w) of the total amount of 5'-GMP and 5'-IMP in the yeast extract is at least 5% w/wbased on NaCl free yeast extract dry matter, preferably it is comprised between 5 and 25% w/w, more preferably between 5 and 20% w/w, even more preferably between 5 and 15% w/w.

We have surprisingly found that when a yeast extract having a ratio between the percentage (w/w) of free amino acids and the percentage (w/w) of the total amount of 5'-GMP and 5'-IMP lower than 3.5 is used, an optimal improving effect on the taste of the beverage is obtained without conferring to the beverage any brothy/bouillon taste typical of the yeast extract. Therefore in a preferred embodiment of the invention a yeast extract is used wherein the ratio between the percentage (w/w) of free amino acids and the percentage (w/w) of the total amount of 5'-GMP and 5'-IMP in the yeast extract is at least 0.1, preferably at least 0.2, more preferably at least 0.5 and most preferably at least1. In a preferred embodiment of the invention a yeast extract is used wherein the ratio between the percentage (w/w) of free amino acid and the percentage (w/w) of the total amount of 5'-GMP and 5'IMP in the yeast extract is lower than 3, preferably lowerthan 2.5 and more preferably lower than 2.

The yeast extracts used in the method according to the invention are preferably characterised by a low sodium chloride content. The latter is advantageous because a high content of sodium in the diet is detrimental to health. The latter is also advantageous to the taste of the beverage where the yeast extract is used. The amount of sodium chloride in the yeast extract is preferably lower than 8% w/w, preferably comprised between 0 and 7% w/w based on yeast extract dry matter, preferably between 0 and 5% w/w, more

preferably between 0 and 3% w/w, even more preferably between 0 and 1.5% w/w, most preferably between 0 and 1% w/w based on yeast extract dry matter.

Generally the yeast extract used in the method of the invention comprises as well mono sodium glutamate (MSG).

When a yeast extract with the above-mentioned characteristics is added to beverages, for example to carbonated or not-carbonated soft drinks, to fruit or vegetable juices, or to several types of beer, the flavour profile of the beverage is considerably improved. For example, when yeast extracts with the above-mentioned characteristics were added to Fanta® Light, the latter caused a shift of taste from orange peel to orange juice. When the same test was performed in alcohol-free beer, the taste shifted form watery to a taste having stronger beer notes.

In a preferred embodiment the method of the invention is characterised in that, the specific vegetable and/or fruity and/or alcoholic note in the taste and/or aroma of the beverage is improved. The addition of a yeast extract does not result in any taste or specific note of the yeast extract itself.

The beverages, which taste and/or aroma can be improved with the method of the invention, are not limited. Some examples of these beverages are: carbonated soft drinks either naturally or artificially sweetened like Coca Cola® Light, Fanta® Light, 7-Up® Light, non carbonated drinks like tea. The use of the invention can be applied to fruit juices like orange juices, apple juices, grape fruit etc. and to all types of beer, either alcohol-free or not. It is intended that the list of possible beverages is not limiting.

Preferably an amount of at least 0.02% w/w of yeast extract relative to the beverage is used, preferably at least 0.03% w/w and more preferably at least 0.04% w/w. Preferably an amount of lower than 3% w/w of yeast extract relative to the beverage is used, more preferably lower than 2% and most preferably lower than 1% w/w.

Another goal of the invention is to provide with beverages with an improved taste and/or aroma obtained by this method.

Therefore, the invention provides a beverage for human consumption having an improved taste and/or aroma obtainable by a method of the invention.

The invention will now be illustrated by some examples, which however are not intended to be limiting.

Example 1

In this example the effect of the addition of a yeast extract comprising at least 10% w/w of 5'-ribonucleotides, at least 5% w/w of 5'-IMP+5'-GMP, less than 8% w/w NaCl and a ratio between the percentage (w/w) of free amino acids and the percentage (w/w) of the total amount of 5'-IMP + 5'-GMP in the yeast extract lower than 3.5 was tested on several light beverages.

Ingredients

Maxarome Plus LS powder (DSM-Delft The Netherlands)*

Water

Coca Cola Light (Coca Cola Enterprises Nederland B.V.)

Fanta Light (Coca Cola Enterprises Belgium sprl/bvba)

7-Up Light (Vrumona The Netherlands)

Lipton Icetea Light (Lipton)

Coca Cola Light contains sodium-cyclamate, acesulphame-k and aspartame.

Fanta Light contains aspartame, saccharine.

7 UP Light contains aspartame

Lipton Icetea contains, aspartame, acesulphame-K.

* Maxarome Plus LS powder is a yeast extract comprising 5'-ribonucleotides. It comprises 13% w/w of total 5'-ribonucleotides, 6.5% w/w of 5'-IMP + 5'-GMP, 11.8% w/w of free amino acids, these percentages all based on NaCl free yeast extract dry matter, 0.8% w/w of NaCl and a degree of protein hydrolysis of 34%.

A 1% w/w solution in water of Maxarome Plus LS was prepared.

Two grams of the1% w/w Maxarome Plus LS water solution were added to 50 g samples of the following light drinks: Coca Cola Light®, Fanta Light®, 7-Up Light®, and Lipton Icetea Light®. Each sample of light drink contained 0.04% w/w of Maxarome Plus LS. Blank samples of each light drink were prepared by adding 2 g of water to 50 g

samples of each drink. The ratio between artificial sweeteners and yeast extract in the samples in approximately 1 to 1.5. A panel of 6 experts in the tasting of beverages tested the blank samples and those containing 0.04% w/w of Maxarome Plus LS. All experts recognised that the light drink comprising the yeast extract had a better taste, the light drinks comprising the yeast extracts were recognized as less bitter, therefore more pleasant in taste. The long lasting after taste typical of artificial sweeteners was completely suppressed. The taste of the samples comprising Maxarome Plus LS if compared with that of the blank samples was judged as follows. The Coca Cola light flavour profile shifted to less watery, more mouthfeel. In the Fanta flavour profile there was a shift in taste from orange peel to orange juice. The taste of the 7-Up sample comprising Maxarome Plus LS was judged less astringent and more mouthfeel. In the Lipton Ice Tea sample the astringent notes from the tea were decreased and the flavour became richer and more balanced.

Example 2

In this example the yeast extract used in example 1 was examined on several juices and beers.

Ingredients

Maxarome Plus LS powder (DSM-Delft)

Water

Tomato Juice (Albert Heijn, The Netherlands)

Grape Juice(Albert Heijn, The Netherlands)

0% alcohol Amstel® malt beer

0% alcohol Bavaria® malt beer

2% vol alcohol Lingen's Blond® premium quality beer

5% vol alcohol Heineken Pilsener® premium quality beer

5% vol alcohol Brand® beer Pilsener

Water

Two grams of the1% w/w Maxarome Plus LS water solution were added to 50 g samples of the following light drinks: Tomato Juice (Albert Heijn), Grape Juice (Albert Heijn), 0% alcohol Amstel malt beer, 0% alcohol Bavaria malt beer, 2% vol alcohol

Lingen's Blond premium quality beer, 5% vol alcohol Heineken Pilsener premium quality beer, 5% vol alcohol Brand beer Pilsener. Blank samples were prepared as described in example 1.

The panel of 6 experts of example 1 tested both types of solution and the blank for each drink. All experts recognised the drinks comprising the yeast extract as better in taste.

The taste of the samples comprising the yeast extract if compared with that of the blank samples was judged as follows. In the tomato juice a clear increase of full tomato and a less peaky note was observed. In the grape juice a more fresh, balanced aroma was observed. The alcohol-free beers were judged as less watery in taste, with stronger beer notes. The 2% vol alcohol beers gave a more complete, full beer sensation. The beers containing 5% vol alcohol gave a stronger bitter hop note.

Example 3

In this example the effect of the concentration in light drinks of the yeast extract used in example 1 is examined.

Ingredients

Maxarome Plus LS powder (DSM-Delft)*

Water

Coca Cola Light (Coca Cola Company) (the beverage comprises approximately 0.06% w/w of artificial sweetener).

A 4% w/w solution in water of Maxarome Plus LS was prepared.

The following solutions were prepared:

(1) 0.5 g of 4% w/w Maxarome Plus LS were added to 50 g Coca Cola Light giving a 0.04% w/w Maxarome in Coca Cola Light.

(2) 0.4 g of 4% w/w Maxarome Plus LS were added to 50 g Coca Cola Light giving a 0.032% w/w Maxarome in Coca Cola Light.

(3) 0.3 g of 4% w/w Maxarome Plus LS were added to 50 g Coca Cola Light giving a 0.025% w/w Maxarome in Coca Cola Light.

(4) 0.2 g of 4% w/w Maxarome Plus LS were added to 50 g Coca Cola Light giving a 0.016% w/w Maxarome in Coca Cola Light.

Blank samples for each solution were prepared as solution (1) to (4) by replacing the amount of Maxarome solution with water.

The panel of 6 experts of example 1 tested all solutions. While solution (1) to (3) were recognised as less bitter and without aftertaste as well as were recognized as better in taste in respect with the corresponding blanks, for solution (4) no difference in respect with the blank was found.

This example also shows that the skilled person can easily determine the effective amount of yeast extract needed according to the present invention for Coca Cola light in this case or for a food product containing an artificial sweetener in general.

Example 4

In this example the effect of the yeast extract described in example 1 to improve the taste of Fanta is compared with other yeast extracts.

Ingredients

Maxarome Plus LS powder (DSM-Delft, The Netherlands)*

KRIT* (Ohly, Marl, Germany)

KAT** (Ohly, Marl, Germany)

Water

Fanta Light (Coca Cola Company)

*KRIT is a yeast extract comprising 8.5% w/w of total 5'-ribonucleotides, 4.3% w/w 5'-GMP and 5'-IMP, 16.2% w/w of free amino acids, these percentages based on NaCl free yeast extract dry matter, 12% NaCl, and having a degree of protein hydrolysis of 38%.

**KAT is a yeast extract comprising 44.6% w/w of free amino acids, these percentage based on NaCl free yeast extract dry matter, 1% NaCl, and having a degree of protein hydrolysis of 57%.

Solutions comprising 0.02% w/w of KRIT, KAT and Maxarome Plus respectively in Fanta were prepared in an analogous way as described in examples 1 and 2. For Maxarome Plus also a solution 0.04% w/w in Fanta was prepared. A panel of 6 experts in the tasting of foodstuff tested these samples and compared the taste thereof. The solution comprising KRIT yeast extract where characterised by an orange peel peaky taste. A light bouillon-like taste was also present. The solution comprising KAT yeast extract where also characterised by peaky orange taste and by a bouillon-like taste. The taste of the solution comprising Maxarome where characterised by a shift of taste from orange peel to orange juice and by no bouillon-like taste.

CLAIMS

1. A method for improving the taste and/or aroma of a beverage for human consumption by addition of a yeast extract, wherein said yeast extract comprises free amino acids and one or more 5'-ribonucleotide(s), wherein the total amount of said one or more 5'-ribonucleotide(s) is at least 10% w/w, wherein said one or more 5'-ribonucleotide(s) comprises 5'-GMP and optionally 5'-IMP and wherein the ratio between the percentage (w/w) of free amino acids and the percentage (w/w) of the total amount of 5'-GMP and 5'-IMP in the yeast extract is lower than 3.5, all weights in the yeast extract being based on NaCl free yeast extract dry matter.
2. A method according to claim 1 wherein said yeast extract comprises an amount in free amino acids lower than 40%, preferably lower than 35%, more preferably lower than 25%, most preferably lower than 20% NaCl free yeast extract and/or said yeast extract dry matter comprises an amount of free amino acids of at least 1% based on NaCl free yeast extract dry matter and more preferably of at least 5%.
3. A method according to claims 1 or 2, characterised in that the degree of protein hydrolysis in said yeast extract is lower than 50%, preferably comprised between 5 and 45%, more preferably between 10 and 45%, even more preferably between 20 and 45%, and most preferably 30 and 45%.
4. A method according to any one of claims 1 to 3 wherein in that said yeast extract comprises a total amount of the one or more 5'-ribonucleotide(s) between 10 and 50% w/w based on NaCl free yeast extract dry matter, preferably between 10 and 40% w/w, more preferably between 10 and 30%, and most preferably between 10 and 25% w/w.
5. A method according to any one of claims 1 to 4 wherein the yeast extract comprises an amount of sodium chloride lower than 8% w/w, preferably comprised between 0 and 7% w/w, preferably between 0 and 5% w/w, more preferably between 0 and 3% w/w, even more preferably between 0 and 1.5% w/w, and most preferably between 0 and 1% w/w based on yeast extract dry matter.

6. A method according to any one of claims 1 to 5 wherein the percentage (w/w) of the total amount of 5'-GMP and 5'-IMP in the yeast extract is at least 5%w/w based on NaCl free yeast extract dry matter, preferably it is comprised between 5 and 25% w/w, more preferably between 5 and 20% w/w, even more preferably between 5 and 15% w/w.
7. A method according to any one of claims 1 to 6 wherein the ratio between the percentage (w/w) of free amino acids and the percentage (w/w) of the total amount of 5'-GMP and 5'-IMP in the yeast extract is at least 0.1, preferably at least 0.2, more preferably at least 0.5 and most preferably at least 1 and/or that this ratio is lower than 3, preferably lower than 2.5 and most preferably lower than 2.
8. A method according to any one of claims 1 to 7 wherein an amount of at least 0.02% w/w of yeast extract relative to the beverage is used, preferably at least 0.03% w/w and most preferably at least 0.04% w/w and/or that an amount of lower than 3% w/w of yeast extract relative to the beverage is used, preferably lower than 2,5% w/w and most preferably lower than 2% w/w.
9. A method according to any one of claims 1 to 8 wherein the specific vegetable and/or fruity and/or alcoholic note in the taste and/or aroma of the beverage is improved.
10. A beverage for human consumption having an improved taste and/or aroma obtainable by the method of any one of claims 1 to 9.
11. A beverage according to claim 10 wherein the beverage is a carbonated beverage.
12. A beverage according to claim 10 or 11 wherein the beverage is a juice.
13. A beverage according to claim 12 wherein the beverage is a vegetable juice.
14. A beverage according to claim 12 wherein the beverage is a fruit juice.
15. A beverage according to claim 10 or 11 wherein the beverage is a beer.
16. Use of yeast extract for improving the specific vegetable and/or fruity and/or alcoholic note in the taste and/or aroma of a beverage wherein the said yeast extract comprises free amino acids and one or more 5'-ribonucleotide(s), wherein the total amount of said one or more 5'-ribonucleotide(s) is at least 10% w/w, wherein said one or more 5'-ribonucleotide(s) comprises 5'-GMP and optionally 5'-IMP and wherein the ratio between the percentage (w/w) of free amino acids

and the percentage (w/w) of the total amount of 5'-GMP and 5'-IMP in the yeast extract is lower than 3.5, all weights in the yeast extract being based on NaCl free yeast extract dry matter.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A23L1/22 A23L1/226 A23L1/229 A23L1/236 A23L1/30
A23L2/00 A23L2/52 A23L2/56

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, FSTA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 016 708 A (NIHON TOBACCO INC) 5 July 2000 (2000-07-05) the whole document ---	1-16
X	EP 0 354 610 A (UNILEVER NV ;QUEST INT (NL)) 14 February 1990 (1990-02-14) column 5, line 23 - line 30; claims; examples ---	1-16
X	GB 1 110 746 A (GEN MILLS INC) 24 April 1968 (1968-04-24) the whole document ---	1-16
X	EP 0 418 616 A (DEUTSCHE HEFEWERKE) 27 March 1991 (1991-03-27) page 2, line 23 -page 3, line 4; example 12 ---	1-16
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Form PCT/ISA/210 (second sheet) (July 1992)

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 060 903 A (AJINOMOTO KK) 29 September 1982 (1982-09-29) page 1, line 1 -page 5, line 10; claims 1-3; example 2	1-16
A	DE 19 63 736 A (HAARMANN&REIMER) 24 June 1971 (1971-06-24) page 2, paragraph 3; claims; tables	1-16
A	EP 0 122 400 A (TAKEDA CHEMICAL INDUSTRIES LTD) 24 October 1984 (1984-10-24) page 1, line 17 -page 2, line 26 page 3, line 6 - line 26 page 4, line 8 - line 35; table 2	1-16
A	US 3 647 482 A (YUEH MAO HSUN) 7 March 1972 (1972-03-07) examples 1,2	1-16

INTERNATIONAL SEARCH REPORT

Information on patent family members

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